

FINANCIAL REPORT

WATER

1938

FINANCIAL REPORT
OF THE
DIVISION OF ACCOUNTS
(WATER)

March 13, 1939

To the Director of Public Affairs,
Newark, New Jersey.

Dear Sir:

Attention Mr. Jas. M. Costello, Chief Engr.

I submit herewith the Financial Report of the
Division of Accounts-Water, for the year ending December
31st, 1938, contained in the following statements:

Income Account for the year ending December 31st,
1938.

Balance Sheet as at December 31st, 1938.

Respectfully,

Chief Accountant.

March 13th, 1939.

To the Director of Public Affairs,

Newark, New Jersey.

Dear Sir:

I submit herewith schedules supporting the Income Account and Balance Sheet presented to you on February 1, 1939, and offer the following explanation of the various schedules:
FIXED CAPITAL, \$46,627,935.16.

This schedule shows the additions to the plant and equipment during the year, the principal additions being amounts expended in:

Incinerator, Macopin Intake	\$ 738.09
Forestry	635.00
Chlorine Building-Macopin	160.25
General Distribution	
Mains	468,424.60
Fire Hydrants	10,838.90
	\$480,796.84

DEPRECIATION SCHEDULE \$8,148,145.09.

This schedule shows in detail the depreciation accrued during the year on plant, \$498,086.09 and on miscellaneous equipment \$13,144.51, based on unit rates set up by the Chief Accountant. There is also shown the amount of depreciation on each individual group at the beginning of the year. The total reserve at December 31, 1938 on plant and equipment is \$8,148,145.09 and the net depreciated cost of plant is \$38,479,790.07.

CASH - Current \$400,595.42, Capital \$142,520.36.

This amount is in the hands of the City Treasurer in the General City Funds, with the exception of trust funds contained therein in amount of \$5,923.47.

CONSUMERS' ACCOUNTS RECEIVABLE, \$691,484.14.

NO. JERSEY DIST. WATER SUPPLY COMMISSION ACCOUNTS RECEIVABLE, \$222,276.40

This amount represents open accounts owing and collectable from consumers, representing verified balances on the records in the Bureau, with the exception of water and service arrears in the hands of the City Comptroller in amount of \$44,373.34, which amount is certified by Fruder & Puder.

Sinking Fund	\$ 3,235,605.60
Funded Debt	20,620,000.00
Notes	285,000.00
Interest on Bonds for Year	927,298.75

The investments are held and controlled by the Sinking Fund Commission and are verified with City Auditor Records. Opposite the several amounts in sinking fund is set the amount of bonds outstanding, arranged in order of maturity.

The funded debt was decreased during 1938 by \$425,000.00 - Notes issued, \$285,000.00 - Serial Bonds paid, \$510,000.00 - Sinking Fund Bonds paid \$200,000.00.

The interest on funded debt during year was net, \$927,298.75, being a decrease of \$19,172.50 over previous year. Detail is also shown of interest accrued and not due at December 31st, in amount of \$232,650.12.

TRUST FUNDS, \$5,923.47.

OPERATING REVENUE, \$2,614,631.19.

This schedule shows the volume of water delivered during the year, also water sold direct from Manaque Reservoir to other municipalities in amount of \$135,372.46. The operating revenue shows an increase of \$22,113.35.

During the past year there was no let up in the activities of the Bureau with regard to service and construction work.

The following tabulation of metered and unmetered service should be noted by all users of city water:

	Revenue Obtained	Water Consumed	Percentage of Revenue
Metered	2,102,659.49	14,823. Mill. Gals.	82.5
Unmetered	38,405.57	250. " "	1.5
Other Systems	245,301.60	3,628. " "	9.6
Wanaque water sold direct to other Systems	135,372.46	(Unknown)	5.3
Municipal, Miscellaneous	26,538.31	430.	1.1

METERED PROPERTIES

	Cubic Feet	Million Gallons
1. Domestic -		
One and two-family dwellings	430,339,000.	
1A Over two-family dwellings	530,921,000.	
2. Non-Domestic, Industrial -		
Mills, factories, railroads	694,321,000.	
3. Commercial -		14,823.055
Stores, stables, office buildings	284,402,000.	
4. Semi-Public Buildings -		
Hospitals, private schools, churches	41,576,354.	
Services to Other Systems	485,079,038.	3,628.635
Municipal Water Service	56,392,500.	421.844
Total	2,523,030,892.	18,873.534

Unmetered -

Private dwellings, building work, street flushing, etc.	34,591,939.	258.765
Fire extinguishers, loss from burst street mains and leaks	219,477,573.	1,641.802

The proportion of unmetered consumption chargeable against private dwellings has been estimated.

ACCOUNTING SYSTEM.

The accounting system presents a complete financial statement showing operating revenue, expenditure, yearly income and the surplus or deficit for that time.

CLAIMS

There were 1015 claims for allowance filed with the Adjustment Committee on metered properties, on which adjustments amounting to \$5,809.55 were allowed. This represents an increase of 52 in number of claims filed, but a decrease in allowances.

The Bureau rule, which required a "licensed plumber's repair statement" presented to the Adjustment Committee before consideration of any claim on large water bill, is still effective.

Owners think a large water bill is sufficient warrant for an adjustment, but the requirement of plumber's statement of the work that was performed lessens the deductions for allowances on claims.

Ice machines and electric ice-boxes, when the automatic valves are not properly serviced by the sellers or agents, are productive of large water bills. Many cases of this kind, when valves are stuck, show a continuous stream of water flowing to the sewer. The meter tells its story - the owner or landlord is paying the ice bills along with normal water bills.

Respectfully,

Chief Accountant.

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

December 31, 1938

BALANCE SHEET

ASSETS

CAPITAL ASSETS

Cost of properties including land,
buildings, equipment, etc., less
depreciation at January 1, 1938
Net additions during the year less
net depreciation for year

\$38,496,908.25

17,118.18

\$38,479,790.07

MATERIAL AND SUPPLIES

Operating
Capital

128,560.65

9,370.72

CURRENT ASSETS

Accounts Receivable -

No. Jersey Dist. W.S. Comm.	222,276.40
Meter Rates Uncollected	516,785.28
Unmetered Rates Uncollected	6,034.74
Municipal Uncollected	7,747.15
Tapping Mains Uncollected	115,190.39
Builders Uncollected	454.46
Water & Service Arrears (Comptroller)	44,373.34
Miscellaneous	898.78
	<u>913,760.54</u>

Less Reserve for "Deductions" & Doubtful Accounts	810,044.27
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103,716.27

Revenue Cash

394,671.95

498,388.22

SPECIAL FUNDS

Capital Cash
Watershed Extension Fund, Cash
Trust Funds, Cash

142,452.19

68.17

5,923.47

148,443.83

DEFERRED CHARGES TO OPERATIONS

554.91

SINKING FUND

Sinking Fund - Regular
Sinking Fund - Excess Payments

3,151,419.34

84,186.26

3,235,605.60

\$42,620,714.00

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

December 31st, 1938

BALANCE SHEET

LIABILITIES

CAPITAL LIABILITIES

Bonded-Indebtedness		20,620,000.00
Notes		285,000.00

CURRENT LIABILITIES

Consumers' Deposits	5,923.47	
Sundry Creditors - Revenue	13,578.90	
Sundry Creditors - Capital	16,196.18	
Unpaid Accrued Wages - Revenue	11,091.98	
Unpaid Accrued Wages - Capital	1,163.14	
Interest Accrued on Bonds	231,581.37	
Interest Accrued on Notes	1,068.75	280,603.79

REVENUE APPLICABLE TO 1939 PERIOD

3,023.84

SINKING FUND RESERVE

Sinking Fund - Regular	3,151,419.34	
Sinking Fund - Excess Payments	84,186.26	3,235,605.60

CONSTRUCTION OF MAINS RESERVE

125,092.87

WATERSHED EXTENSION RESERVE

68.17

CAPITAL SURPLUS

Balance at January 1, 1938	17,166,908.25
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ADD

Sinking Fund Bonds Paid	200,000.00
Construction from Capital Funds	488,634.22
Construction from Revenue Funds	14,848.92

17,870,391.39

SUBTRACT

Bond Issue	285,000.00
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Sinking Fund	
& Serial	
Bond Pay-	
ments	555,746.05
Amortization	498,086.09
Misc. Equip-	
ment Re-	
serve	13,144.51
	511,230.60

	44,515.45	
Sinking Fund Payments	45,746.05	1,230.60
		286,230.60
		17,584,160.79

REVENUE SURPLUS

Balance at January 1, 1938	293,426.17
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Add Surplus from Operations during	
year, as per Attached Exhibit	14,453.84

Cash Deficit 1937 in 1938 Budget	74,127.85
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382,007.86

Construction from Revenue Funds	14,848.92
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367,158.94

42,500,714.00

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

STATEMENT OF EARNINGS AND EXPENDITURES

For the year ending December 31, 1938

Net Sales of Water		2,412,904.97	
North Jersey Dist. Water Supply Comm.		<u>135,372.46</u>	2,548,277.43
Miscellaneous Operating Revenue			<u>59,037.64</u>
Total Operating Revenue			2,607,315.07
<u>DEDUCT</u>			
Water Collecting Expenses		222,909.03	
Purification System Expenses		24,453.51	
Distribution System Expenses		448,736.59	
Commercial & New Business Expenses		179,698.61	
General & Miscellaneous Expenses	262,287.69		
Amortization - Paid into Sinking Fund	<u>498,086.09</u>	<u>760,373.78</u>	<u>1,636,171.52</u>
			971,143.55
<u>ADD</u>			
Miscellaneous Rents, Interest and Non-Operating Revenue			<u>7,316.12</u>
Gross Corporate Income			978,459.67
<u>DEDUCT</u>			
Interest on Funded Debt			<u>919,490.38</u>
			58,969.29
<u>DEDUCT</u>			
Regular Sinking Fund Payments	45,746.05		
Serial Bond Payments	<u>510,000.00</u>	<u>555,746.05</u>	
Less Amount Provided by Amortization under General & Miscellaneous Expenses	<u>498,086.09</u>		
Miscellaneous Equipment Reserve Under Various Expense Accounts	<u>13,144.51</u>	<u>511,230.60</u>	<u>44,515.45</u>
To REVENUE Surplus year ending December 31, 1938			14,453.84

DEPARTMENT OF PUBLIC AFFAIRS
DIVISION OF ACCOUNTS - WATER

BALANCE SHEET

December 31, 1938

PUBLIC UTILITY FORM

ASSETS.

		Balance at Close of Year	Net Change During Year
Fixed Capital, December 31, 1938		46,627,935.16	434,203.73
Materials and Supplies		137,931.37	26,985.45
<u>CASH</u>			
Watershed Extension Fund	68.17		
Trust Funds	5,923.47		
General Funds	394,671.95		
Capital Funds	142,452.19	543,115.78	42,468.62
North Jersey Dist. Water Supply Commission	222,276.40		
Consumers' Accounts Receivable	691,484.14	913,760.54	78,715.09
Prepayments (Fire Insurance)		554.91	1,883.25
Sinking Funds (Regular)	3,151,419.34		
Sinking Funds (Excess Payments)	84,186.26	3,235,605.60	36,780.67
		<u>\$51,458,903.36</u>	<u>\$247,450.45</u>

LIABILITIES

Funded Debt	20,620,000.00	710,000.00
Notes Payable	285,000.00	285,000.00
Consumers' Deposits	5,923.47	888.43
Other Accounts Payable	29,775.08	16,615.75
Unearned Revenue (1939 Period)	3,023.84	93.67
Interest Accrued	232,650.12	7,808.37
Other Accrued Liabilities	12,255.12	3,292.70
Amortization (or Retirement) Reserve	8,148,145.09	451,321.91
Miscellaneous Reserves	4,170,810.91	241,157.85
Capital Surplus	17,584,160.79	417,252.54
Earned Surplus	367,158.94	73,732.77
	<u>\$51,458,903.36</u>	<u>\$247,450.45</u>

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

Plant and Equipment Depreciation Schedule

December 31, 1938

Title of Account		Accrued to Jan. 1, 1938	Accrued dur- ing 1938	Total ac- crued to Dec. 31, 1938
112	<u>RESERVATION STRUCTURES</u>			
	Maoplin Village	33,439.17	1,814.70	35,053.87
	Superintendent's House, Watershed	976.18	336.89	1,313.07
	Forester's House, Watershed	91.25	92.98	184.23
	Concrete Benchers, Watershed	64.53	21.51	86.04
	Garage, Watershed	233.50	19.86	253.36
104	<u>WATER DIVERSION RIGHTS</u>			
113	<u>IMPOUNDING RESERVOIRS</u>			
	Cost of Watershed, except Pipe Line	400,000.00	25,000.00	425,000.00
	Sanague Reservoir	540,000.00	135,000.00	675,000.00
115	<u>SPRINGS & WELLS</u>			
	Driven Wells, Belleville	22,274.21		22,274.21
	Caisson Wells, Belleville	2,452.80		2,452.80
	Drilled Wells, Belleville	36,154.18		36,154.18
116	<u>INTAKE & SUPPLY LINES</u>			
	Cost of Watershed Pipe Line (M. H. Sherrard's Estimate)	800,000.00	50,000.00	850,000.00
	Butler Connections	1,427.57	79.31	1,506.88
	48" Pipe Line, Gate House, Pequannock	132,754.71		132,754.71
124	<u>CHEMICAL TREATMENT PLANT</u>			
	Chlorine Feeding Apparatus	9,690.90	271.00	9,961.90
	Chlorine Building, Maoplin	710.11	198.67	908.78
127	<u>PUMPS STATION STRUCTURES</u>			
	Belleville Chimney	10,056.25		10,056.25
	Belleville Riverwall & Dock	266,110.99		266,110.99
135	<u>STORAGE RESERVOIRS, TANKS & STANDPIPES</u>			
	Belleville Keeper's House	3,986.31	108.43	4,094.74
	Belleville Receiving Reservoir	126,874.81	4,512.18	131,386.99
	Belleville Fence	2,170.10	255.01	2,425.11
	Belleville Res. Appurtenances	8,199.35	1,054.90	9,254.25
	So. Orange Av. N. P. Reservoir	84,490.51	2,867.83	87,358.34
	Keeper's House - So. 9th St.	1,990.05	184.41	2,174.46
	Cedar Grove Reservoir Fence	13,955.90		13,955.90
	Keeper's House, Lab. & Road	2,733.57	55.49	2,789.06
	Cedar Grove Water System	692.79		692.79
	Cedar Grove Garage	316.42	24.80	341.22

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

Plant and Equipment Depreciation Schedule

December 31, 1938

Title of Account		Accrued to Jan. 1, 1938	Accrued dur- ing 1938	Total ac- crued to Dec. 31, 1938
136	<u>DISTRIBUTION MAINS & ACCESSORIES</u>			
	High Pressure System	201,403.28	11,449.79	212,853.07
	L.P. Distribution Mains General	3,691,316.58	183,769.66	3,853,961.72
			16,581.90	
			37,706.42	
	Witometer Boxes	83,671.00	1,718.61	85,389.61
	60" Steel Pipe Line	469,817.00	16,454.72	486,271.72
	35" Cast Iron Pipe Line	60,600.00	2,150.00	62,750.00
	60" Steel Supply Main #1	83,291.61	9,308.56	92,600.17
	60" Steel Supply Main #2 (Elizabeth)	148,412.87	21,826.77	170,239.64
139	<u>FIRE HYDRANTS & FIRE CISTERNS</u>			
	High Pressure Hydrants	20,023.95	1,154.45	21,178.40
	Low Pressure Hydrants	129,202.86	8,559.49	137,762.35
141	<u>GENERAL STRUCTURES</u>			
	Pequannock Gate House Bldg., 5th & 6th Sts.	10,834.47	569.19	11,403.66
	Eighth Street Stable	17,585.75	760.31	18,346.06
	New Meter Testing Station	19,522.31	973.26	20,495.57
	Improvements, Wilson Ave.	3,019.87	294.64	3,314.51
	Cedar Grove Laboratory	8,086.64	813.77	8,900.41
		7,448,604.37	498,086.09	7,908,984.04
			37,706.42	
	<u>MISCELLANEOUS EQUIPMENT</u>			
142A	General Office Equipment	47,601.66	2,464.51	49,818.08
			248.09	
142B	General Shop Equipment	92,544.42	3,274.43	89,138.50
			6,680.35	
142D	Transportation Equipment (Stable)	1,460.60	177.90	1,462.50
			176.00	
142E	Transportation Equipment (Garage)	98,834.35	6,686.30	90,468.82
			15,051.83	
142F	Miscellaneous Equipment (Laboratory)	7,777.78	541.37	8,273.15
			46.00	
		248,218.81	13,144.51	239,161.05
			22,202.27	
		7,696,823.18	511,230.60	8,148,145.09
			59,908.69	

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

Plant and Equipment

December 31, 1938

P.U. a/c	Title of Account	Balance at beginning of year 1938	Additions during 1938	Deductions during 1938	Balance December 31, 1938
104	<u>WATER DIVERSION RIGHTS</u>	1,500.00			1,500.00
105	<u>RESERVATION LAND</u>				
	Waterbed Extension Fund	2,489,222.97			2,489,222.97
	New Storage Reservoir	124,527.97			124,527.97
	Exchange for Water	116,280.00			116,280.00
	Bureau of Water Revenue	62,405.80			62,405.80
	Searches on Land	18,051.66			18,051.66
106	<u>OTHER SOURCES OF SUPPLY LAND</u>				
	Driven Wells, Belleville	.00			.00
108	<u>PUMPING SYSTEM LAND</u>				
	Pump House, Belleville	.00			.00
109	<u>STORAGE RESERVOIR LAND</u>				
	Belleville Reservoir	1.00			1.00
	Surrounding Belleville Res- ervoir	12,000.00			12,000.00
	Terrie Property, Belleville	14,175.00			14,175.00
	Surrounding So. Orange Av. High Pressure Reservoir	1.00			1.00
110	<u>OTHER DISTRIBUTION SYSTEM LAND</u>				
	Right of Way - Ellingerland and DePoe	1,200.00			1,200.00
	Right of Way-Belleville #1	450.00			450.00
	Right of Way-Belleville #2	728.35			728.35
	Improvements along Pipe Line at Montclair	2,767.00			2,767.00
	Strip, Central Ave. and Necker St.	1.00			1.00
112	<u>RESERVATION STRUCTURES</u>				
	Macopin Village	80,735.14			80,735.14
	Superintendent's House, Waterbed	16,844.34			16,844.34
	Forester's House, Waterbed	4,649.14			4,649.14
	Green Park Road	21,447.18			21,447.18
	Forestry	15,902.28	635.00		16,537.28
	Concrete Benches, Waterbed	215.09			215.09
	Incinerator-Macopin Intake		738.09		738.09
	Garage - Waterbed	993.15			993.15

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

Plant and Equipment

December 31, 1938

P.O. a/c	Title of Account	Balance at beginning of Year 1938	Additions during 1938	Deductions during 1938	Balance December 31, 1938
104	<u>WATER DIVERSION RIGHTS</u>				
113	<u>IMPOUNDING RESERVOIRS</u>				
	Cost of Waterbed, except				
	Pipe line	3,521,710.34			3,521,710.34
	Searches	2,738.00			2,738.00
	Possibilities accruing				
	from Waterbed	5,780,431.33			5,780,431.33
113	Echo Lake Dam	339,834.21			339,834.21
	Raising Dam, Oak Ridge	671,733.89			671,733.89
	Auxiliary Dam, Charlotte-				
	burg, etc.	18,302.10			18,302.10
	New Charlotteburg Dam	22,372.53			22,372.53
	Raising Overflow, Clinton				
	Reservoir	7,072.28			7,072.28
	Canistear Channel	8,068.88			8,068.88
	Tanasus Reservoir	14,328,432.59			14,328,432.59
	Preliminary Cost of				
	Furnishing Added Water				
	Supply	15,378.00			15,378.00
116	<u>SPRINGS & WELLS</u>				
	Driven Wells, Belleville	22,275.21			22,275.21
	Caisson Wells, Belleville	2,453.80			2,453.80
	Drilled Wells, Belleville	36,165.18			36,165.18
118	<u>INTAKE AND SUPPLY LINES</u>				
	Cost of Waterbed Pipe				
	Line (W. H. Sherrard's				
	Estimate)	2,653,164.80			2,653,164.80
	Butler Connections	3,965.48			3,965.48
	48" Pipe Line - Gate				
	House, Pocomook	132,755.71			132,755.71
119	<u>SETTLING BASINS</u>				
	Settling Basin, Belleville	1.00			1.00
124	<u>CHEMICAL TREATMENT PLANT</u>				
	Chlorine Feeding Apparatus	12,401.90			12,401.90
	Chlorine Building, Macopin	9,933.40	160.25		10,093.65
127	<u>PUMPING STATION STRUCTURES</u>				
	Belleville Chimney	10,057.25			10,057.25
	Belleville Riverwall &				
	Dock	266,111.99			266,111.99

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

Plant and Equipment

December 31, 1938

P.D. a/c	Title of Account	Balance at beginning of year 1938	Additions during 1938	Deductions during 1938	Balance December 31, 1938
135	<u>STORAGE RESERVOIRS, TANKS & STAND PIPES</u>				
	Belleville Keeper's House	5,421.35			5,421.35
	Belleville Receiving Resv.	149,435.73			149,435.73
	Belleville Fence	2,550.09			2,550.09
	Belleville Res. Appurtenances	10,548.99			10,548.99
	So. Orange A.V.M.P. Reservoir	98,829.62			98,829.62
	Keeper's House - 9th St.	9,220.25			9,220.25
	Cedar Grove Reservoir	1,186,684.94			1,186,684.94
	Cedar Grove Fence	13,956.90			13,956.90
	Keeper's House, Laboratory and Road	2,924.32			2,924.32
	Cedar Grove Water System	692.79			692.79
	Cedar Grove Garage	1,240.07			1,240.07
136	<u>DISTRIBUTION MAINS & ACCESS- ORIES</u>				
	High Pressure System	1,144,978.87			1,144,978.87
	L.P. Distribution Mains General	9,188,483.24	468,266.13	37,706.42	9,619,048.95
	Fitometer Boxes	85,549.08	158.47		85,549.08
	60" Steel Pipe Line	585,000.00			585,000.00
	36" Cast Iron Pipe Line	215,000.00			215,000.00
	60" Steel Supply Main #1	465,427.78			465,427.78
	60" Steel Supply Main #2, Elizabeth	1,091,338.64			1,091,338.64
139	<u>FIRE HYDRANTS & FIRE CISTERNS</u>				
	High Pressure Hydrants	115,444.83			115,444.83
	Low Pressure Hydrants	427,974.64	10,838.90		438,813.54
141	<u>GENERAL STRUCTURES</u>				
	Land, West Side of Bloom- field Av. & No. 6th St.	2,300.00			2,300.00
	Pegannock Gate House Bldg., 5th & 6th Sts.	28,459.42			28,459.42
	8th St. Stable	38,015.74			38,015.74
	Land between No. 8 & 9 Sts.	2,000.00			2,000.00
	Land for Stable & Pipe Yard, No. 8th St. & 14th Ave.	11,000.00			11,000.00
	Land - West Side Summer Av.	4,000.00			4,000.00
	New Water Testing Station	48,662.93			48,662.93
	Land - Wilson Ave.	20,565.00			20,565.00
	Land - Stockton St.	750.00			750.00
	Improvements - Wilson Ave.	14,732.10			14,732.10
	Franklin St.	14,500.00			14,500.00
	Cedar Grove Laboratory	40,688.70			40,688.70

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

Plant and Equipment

December 31, 1938

P.U. a/c	Title of Account	Balance at beginning of year 1938	Additions during 1938	Deductions during 1938	Balance December 31, 1938
142	<u>MISCELLANEOUS EQUIPMENT</u>				
A	General Office Equipment	57,691.69	5,437.37	263.09	62,925.97
B	General Shop Equipment	109,621.71	4,245.72	6,915.66	100,951.77
D	Transportation Equip- ment, Stable	2,046.50	100.00	176.00	1,970.50
D	Transportation Equip- ment, Garage	125,993.35	3,710.30	15,076.83	114,626.82
E	Miscellaneous Equip- ment, Laboratory	2,698.69	35.50	47.00	2,690.19
143	<u>OTHER TANGIBLE WATER CAPITAL</u>				
	Engineers' Maps & Records	20,000.00			20,000.00
		846,193,731.43	494,388.73	60,185.00	46,627,935.16

To the Director of the Department of Public Affairs,

Newark, New Jersey.

Dear Sir:

I herewith submit report of receipts and disbursements for the year 1938:

<u>RECEIPTS</u>			
Balance - January 1, 1938 - Operating Funds			240,611.67
Cash Deficit 1937			<u>74,127.85</u>
Balance			314,739.52
<u>OPERATING REVENUE</u>			
No. Jersey Dist. Water Supply Comm.		75,000.00	
Metered Service		2,368,572.47	
Unmetered Service		37,238.51	
Municipal		25,804.92	
Builders		671.22	
Other Construction		486.03	
Miscellaneous Operating Revenue			
New Services - one inch		2,909.80	
Comptroller Collections		4,193.80	
Sundry Personal		49,421.45	
Fitzsimmons' Check Returned		93.75	
H. C. Smith's Checks Returned		208.32	
Insurance - Waterbed		200.00	
Peter Tellerman Duplicate Payment		100.00	
Stunt Taxes Returned		83.66	
<u>NON-OPERATING REVENUE</u>			
Rents		3,365.00	
"N. G." Check Paid		<u>43.63</u>	2,568,392.56
			<u>2,883,132.08</u>
<u>Disbursements</u>			
Weekly Pay Rolls 1937			
(Paid in 1938)	7,486.71		
Weekly Pay Rolls	<u>452,280.97</u>	459,767.68	
Capital		<u>85,439.33</u>	374,328.35
Semi-monthly Pay Rolls		473,525.69	
Capital		<u>28,630.20</u>	444,895.49
Accounts Payable 1937			
(Paid in 1938)	26,219.16		
Accounts Payable	<u>483,945.68</u>	510,164.84	
Capital		<u>354,320.54</u>	151,844.30
Serial Bonds			510,000.00
Sinking Fund			45,746.05
Interest			927,298.75
Garage		42,586.31	
Capital		<u>8,250.40</u>	44,335.91
"N. G." Check			<u>11.28</u>
			2,488,460.13
Balance - December 31, 1938			<u>394,671.95</u>
Pay Roll) Paid 1939	7,337.55		
Accounts Payable) as 1938	<u>4,068.73</u>	11,306.28	
"N. G." Check Paid 1939		<u>11.28</u>	11,895.00
Auditor's Balance - December 31, 1938			<u>383,376.95</u>

CAPITAL FUNDS

Balance, January 1, 1938			338,092.66
Notes			<u>285,000.00</u>
			623,092.66
Weekly Pay Rolls 1937 (Paid in 1938)	1,610.32		
Weekly Pay Rolls	83,829.01		
Semi-monthly Pay Rolls	<u>28,630.20</u>	114,069.53	
Material		123,338.48	
Miscellaneous 1937 (Paid in 1938)	7,755.25		
Miscellaneous	<u>227,226.81</u>	234,982.06	
Garage		<u>8,250.40</u>	480,640.47
Balance, December 31, 1938			142,452.19
Pay Rolls) Paid in 1939	1,163.14		
Accounts Payable) as 1938	<u>16,196.18</u>		17,359.32
Auditor's Balance - December 31, 1938			<u>125,092.87</u>

TRUST FUND

Balance - January 1, 1938			6,811.90
Duplicate Payments	1,911.99		
Miscellaneous	<u>140.00</u>		2,051.99
			8,863.89
Duplicate Payments	1,850.42		
Construction	950.00		
Miscellaneous	<u>140.00</u>		2,940.42
Balance - December 31, 1938			<u>5,923.47</u>

RETAINED EARNINGS FUND

Balance - January 1, 1938	68.17
Balance - December 31, 1938	68.17

DEPARTMENT OF PUBLIC AFFAIRS
DIVISION OF ACCOUNTS - WATER
RESERVES

AMORTIZATION RESERVE

Balance at beginning of year 1938	7,496,823.18
-----------------------------------	--------------

ADD

Accrued during year per Chief Accountant	498,086.09
Reserve Miscellaneous Equipment	13,164.51

Total Credits	\$8,208,053.78
---------------	----------------

DEDUCT

Relaying Mains	37,706.42	
Miscellaneous Equipment	22,202.27	

Balance at close of year	\$8,148,145.09
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CONTRACTUAL RESERVE SINKING FUND

Balance at beginning of year 1938	3,272,386.27
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AND

Payments to December 31, 1938	45,746.05
Earnings to December 31, 1938	117,473.28

Total Credits	\$3,435,605.60
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Sinking Fund Bonds Paid	200,000.00
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Balance at close of year	\$3,235,605.60
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CONSTRUCTION OF SALES RESERVE

Balance at beginning of year 1938	328,727.09
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ADD

Notes	285,000.00
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Total Credits	\$ 613,727.09
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DEDUCT

Relaying Mains	488,634.22
----------------	------------

Balance at close of year	\$ 125,092.87
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PAID-UP FIFTEEN PER CENT RESERVE

Balance at beginning of year 1938	68.17
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Balance at close of year	\$ 68.17
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DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

RESERVES

EXISTING RESERVE

For

Deductions of Prepaid Water Bills
Doubtful & Uncollectable Accounts

6,700.00
804,087.23

Balance at beginning of year 1938

\$ 810,787.23

ADD

Reserve for 1939 Deductions
Reserve for Doubtful Accounts

6,560.00
.00

Total Credits

\$ 817,347.23

DIRECT

Allowance on 1937 Bills (in 1938)
Doubtful Accounts

6,700.00
602.96

7,302.96

Balance at close of year

\$ 810,044.27

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

COMPARATIVE INCOME ACCOUNT

December 31, 1938

Item (or Account)	Amount Applicable to the year	Comparison preceding year
	Totals	Increase (Black) Decrease (Red)
Water Operating Revenue	2,607,315.07	18,725.69
Water Operating Revenue Deductions	1,636,171.52	12,852.71
Water Operating Income	971,143.55	30,979.40
<u>Other Operating Income</u>		
Miscellaneous Rent Revenues 3,505.00		
Other Interest Revenues 244.46		
Other Non-Operating Revenues 3,566.66		
Total Miscellaneous Income	7,316.12	3,336.66
	978,459.67	34,366.06
<u>Deductions from Gross Income</u>		
Interest on Long Term Debt 918,421.63		
Other Interest Deductions 1,068.73		
Miscellaneous Deductions 44,515.45		
Total Deductions	964,005.83	1,936.79
Net Surplus for year	14,453.84	36,302.85

12,852.71

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

SCHEDULE OF WATER CONSUMPTION AND REVENUE

Account	No. of con- sumers Dec. 31	Maxi- mum No. during year	No. of M.G. delivered to consumers during year	Net Amount Credited to Revenue	Average Net Rev- enue per M.G.
Metered Private Service	53,204	53,204	14,823.054	\$2,102,659.49	\$141.85
Unmetered Private Service	1,069	1,076	249.820 Est.	38,405.57	153.73
Service to Other Systems (Water Supply)	19	19	3,628.635	245,301.60	67.60
Manaque Water sold direct to Other Systems			(not known)	135,372.46	
Municipal Water Service to Other City Departments	270	270	421.844	25,294.13	59.96
Miscellaneous Water Service			80.93 Est.	1,244.18	153.73
Total Sales of Water			19,131.446	\$2,548,277.43	
<u>Miscellaneous Operating Revenue</u>					
Services Tapping Mains				9,252.80	
Work for other Bureaus - Repairing Services, Meters and Material Sold, etc.				28,846.53	
Repair Meters				20,159.21	
Wood, etc.				112.00	
Fees, etc.				667.50	
Total Operating Revenues				\$2,607,315.07	

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

OPERATING EXPENSES

1. Water Collecting Expenses

411 Collecting System Wages

(a) Collecting System Superintendence

12,345.36

(b) Collecting System Labor -

#1 Res. Keeper & Helper 3,207.00

#2 Policing Watershed 13,911.79

#3 Cutting Brush & Clearing Highway 512.00

#4 Caretaking Res. & Grannie 28,167.40

#5 Tearing Down Buildings 570.86

#6 Cutting Lumber 4,167.40

#7 Making & Repairing Tools .00

#8 Forestry 2,900.00

#9 Cleaning Toilets, Collecting & Disposing of Garbage, etc. 5,998.04

59,434.09 71,779.45

412 Other Collecting System Expenses

14,571.51

413 Water Purchased

Sanaque

State (Diversion)

121,950.50

4,578.77 126,529.27

415 Collecting System Repairs

(a) Repairs of Reservations -

#1 Buildings 5,310.82

#2 Resurfacing Road .00

#3 Equipment .00

#5 Repairs to Horses or Parts Thereof 3,717.98

9,028.80

(g) Repairs of Intakes and Supply Mains

1,000.00 10,028.80

Total Water Collecting Expenses

222,909.03

2. Purification System Expenses

421 Purification Wages

(a) Purification Superintendence

8,100.00

(b) Purification Labor

8,204.81 16,304.81

422 Purification Supplies & Expenses

7,978.50

425 Purification System Repairs

(f) Repairs of Chemical Treatment Plant

170.20

Total Purification System Expenses

24,453.51

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

OPERATING EXPENSES

3. Distribution System Expenses

461 Water Storage & Distribution

(a) Distribution Superintendence	29,556.47	
(b) Storage Reservoir Labor	29,729.54	
(c) Other Distribution Labor -		
#1 Operating Transmission Lines	7,187.13	
#2 Operating Distribution System	40,166.95	
#3 Operating & Inspecting Services	20,665.80	
#4 Inspecting Hydrants	2,233.48	
#5 Flushing of Water Mains	5,437.16	
#6 Reserve - Stand-by Duty	44,359.36	120,049.84
(d) Other Distribution Expenses	16,451.86	195,787.71

462 Work on Consumers' Premises

(a) Consumers' Meter Expenses	38,298.34	
(b) Consumers' Installation Expenses	18,763.78	57,062.12

466 Repairs of Storage Reservoirs

24,188.22

467 Repairs of Mains & Accessories

(a) Repairs of Transmission Mains	19,603.29	
(b) Repairs of Distribution Mains	21,134.12	40,737.41
(c) Repairs of Consumers' Services	42,629.90	
(d) Repairs of Fire Hydrants and Cisterns	15,348.02	98,715.33

468 Repairs of Consumers' Meters

34,343.83

Services

8,156.78

Gundry Personal

30,482.60

Total Distribution System Expenses

448,736.59

4. Commercial & New Business Expenses

470 Commercial Expenses

(a) Commercial Office Salaries	56,132.58	
(b) Meter Reading & Collecting	110,760.95	
(c) Other Commercial Expenses	10,805.08	

Total Commercial & New Business Expenses

179,698.61

DEPARTMENT OF PUBLIC AFFAIRS
DIVISION OF ACCOUNTS - WATER

OPERATING EXPENSES

5. General & Miscellaneous Expenses

481	<u>Salaries of General Officers</u>		17,609.03
482	<u>Other General Office Salaries</u>	108,595.81	
	(a) General Studies & Reports	<u>1,334.05</u>	109,929.86
483	<u>General Office Supplies & Expenses</u>		14,299.08
484	<u>Law Expenses</u>		2,753.06
485	<u>Injuries and Damages</u>		
	Accidents	978.69	
	Ill Health	<u>4,701.32</u>	5,680.01
486	<u>Insurance</u>		3,132.32
487	<u>Relief Department and Pensions</u>		2,544.90
490	<u>Store & Transportation Expenses</u>		
	(a) Store Expenses	9,704.60	
	(b) Transportation Expenses	<u>17,469.10</u>	27,173.70
493	<u>Repairs of General Structures</u>		10,687.35
494	<u>General Amortization</u>		<u>498,086.09</u>
	Total General & Miscellaneous Expenses		<u>691,895.40</u>
	Total Operating Expenses		\$1,567,693.14
495	<u>Taxes</u>		68,478.38
496	<u>Uncollectable Water Bills</u>		.00
	Total Revenue Deductions		<u>\$1,636,171.52</u>

MISCELLANEOUS DATA

Pequanook

Municipally owned plant. The water supply portion embraces storage reservoirs on the Pequannock River in Morris, Passaic and Sussex Counties, with main conduits to the city. This portion of plant was constructed under legislative authority by contract made in 1889 with the East Jersey Water Company for \$5,000,000.00. This contract contained restrictions regarding the territory which could be supplied from the Pequannock plant, and under this contract the City of Newark can only supply the present and future limits of the City of Newark and the then existing Townships of Belleville, South Orange, East Orange and Clinton. The court has decided this contract contrary to Public Policy.

Manaque

Manaque Supply is owned jointly by Newark and other municipalities, Newark's cost being \$14,328,432.59, entitling the city to 40,500,000 gallons of water a day. The Reservoir was begun in 1919 and finished March 20, 1930. Connection to Newark City Water Mains was made by the Division of Water Engineers July 5th, 1930

All hydrants for municipal use are free.

Regular meter rates changed in 1914, effective January 1, 1935, as follows:

Additional surcharge 15% from October 1, 1933.

Minimum rate, \$6.00 per annum or \$1.50 per quarter for 500 cubic feet. Above 500 cubic feet \$1.00 per thousand.

When bills are paid within thirty days from the first day of the quarter for which they are rendered, the following discounts on sums above the minimum charge of \$6.00 will be allowed: 2 per cent for each \$100. annual payment, 4 per cent for each \$200. and so on until \$2,000., or the maximum discount of forty per cent is attained.

High pressure and out-of-town rates - \$2.00 first 500 cubic feet - \$1.33 1/3 for each 1,000 cu. ft. additional.

Playground Commission, minimum \$1.50 - regular 45¢ per 1000 cu. ft.

Board of Education - minimum \$1.50 - regular 45¢ per 1000 cu. ft. - other schools, 60¢ per 1000 cu. ft.

Hospitals and benevolent institutions - 20¢ per 1000 cu. ft.

Town of Belleville - \$40.00 per 1,000,000 gals.

Large special sales to other municipalities - \$90.00 per 1,000,000 gallons.

**DEPARTMENT OF PUBLIC AFFAIRS
DIVISION OF ACCOUNTS - WATER**

WATER PURCHASED OR SOLD

	No. of M.G. delivered to consum- ers during year	Average price per Mil- lion Gallons	Amount Credited to Revenue	Amount Charged to Expense
Town of Belleville	612.285	80.00	48,982.74	
Town of Bloomfield	1,342.073	30.00	40,262.22	
City of Elizabeth	1,520.360	90.00	136,832.40	
Elizabethtown Water Co.	16.753	105.84	1,773.70	
Commonwealth Water Co. (Town of Irvington)	.677	218.57	147.97	
Town of Montclair	(Minimum - No Water)		2,500.00	
City of East Orange	(Minimum - No Water)		2,500.00	
Wayne, N. J. - Packanack Lake Development Co.	42,041	103.50	4,351.23	
Wayne Township-Dept. of Water	17,794	90.00	1,601.48	
Cedar Grove (Overbrook) - Essex Co. Board of Freeholders	70.554	90.00	6,349.86	
Mr. W. Albright, State Treas.	3,052.510	1.50		4,578.77
No. Jersey Dist. Water Supp. Comm.	7,322.400	16.65		121,959.50
			<u>\$245,301.60</u>	<u>\$126,529.27</u>

TERRITORY SERVED DURING YEAR

Permanent Population (Estimated)

Newark	458,000 Est.
Total Number of Taps - December 31, 1938	54,562
Taps Metered	53,493
Taps Unmetered	1,069
Total Capacity of Storage Reservoirs (M.G.)	11,405
Total Number of Storage Reservoirs	4
Total Number of Distribution Reservoirs	3
Total Capacity of Distribution Reservoirs (M.G.)	701.7
Number of Miles of Mains	527.61
Number of Fire Hydrants	4,824

MONTHLY OUTPUT (Million Gallons)

	<u>Packanack</u>	<u>Manaque</u>	
January	1,140.4	536.2	
February	877.4	478.8	
March	1,208.8	566.2	
April	1,068.4	560.9	
May	1,124.8	593.1	
June	1,000.2	620.0	
July	1,206.3	675.7	
August	1,350.3	753.6	
September	1,012.6	641.7	
October	1,280.9	643.1	
November	1,104.5	617.6	
December	1,127.1	635.5	
	<u>13,451.7</u>	<u>7,321.4</u>	
Total Million Gallons of metered consumption during year			18,873.533
Estimated flat rate consumption, etc (.252) Meters, Flushers, Fountains			258.765
Total million gallons used by respondent during year			19,132.298
Million gallons lost or unaccounted for (7.904)			1,641.802
Total million gallons delivered to mains during year			<u>20,774.100</u>

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF ACCOUNTS - WATER

DRAINAGE AREA

Total number of square miles, 63.7

Area of land owned for protection of supply, 36.41
miles - 57.5 per cent of Watershed.

RESERVOIRS, STORAGE TANKS & STANDPIPES

Classification	No. at close of year	Construction Material	Open or Closed	Capacity
*Panaque Reservoir	1	Earth Dam, Concrete Core	Open	27,800. M.G.
Collecting Reservoirs	4	Earth Dam, Concrete Core	Open	11,405. M.G.
Storage Reservoirs (Distribution)	1	Earth Dam, Concrete Core	Open	678.7 M.G.
	2	Masonry and Earth Bank	Open	23. M.G.

*Newark's share - 40.5 Million Gallons daily.

PURIFICATION SYSTEM.

Sedimentation

Cedar Grove Reservoir, holding about thirteen days' supply, acts as a Sedimentation Basin. The Outlet Gatehouse is arranged so that the reservoir can be by-passed and the supply drawn directly from the watershed. There are two inlets, one near the southern end and the other near the northeast corner. The Outlet Gatehouse is on the west side. The area of Cedar Grove Reservoir is 100 acres and its capacity is 678.7 million gallons.

Purification

Chlorination plants have been installed at Macopin Intake and Cedar Grove Reservoir.

Newark

- Division of Water
Supply

- Misc.
c. 1939

DEPARTMENT OF PUBLIC AFFAIRS

DIVISION OF WATER

CITY OF NEWARK

NEW JERSEY

Hon. Meyer C. Ellenstein
Mayor - Director

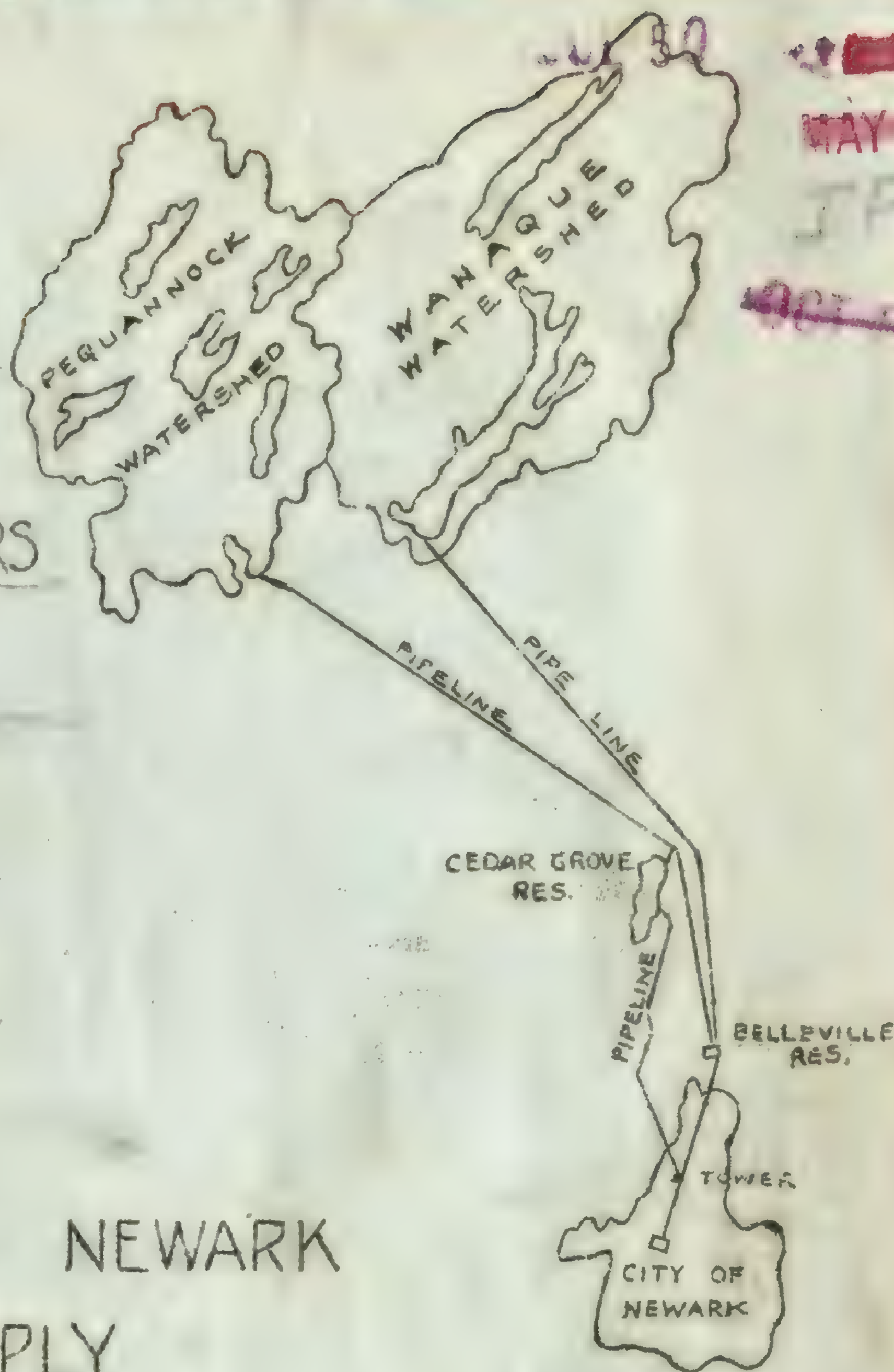
DATA CONCERNING NEWARK
WATER SUPPLY

PEQUANNOCK SUPPLY

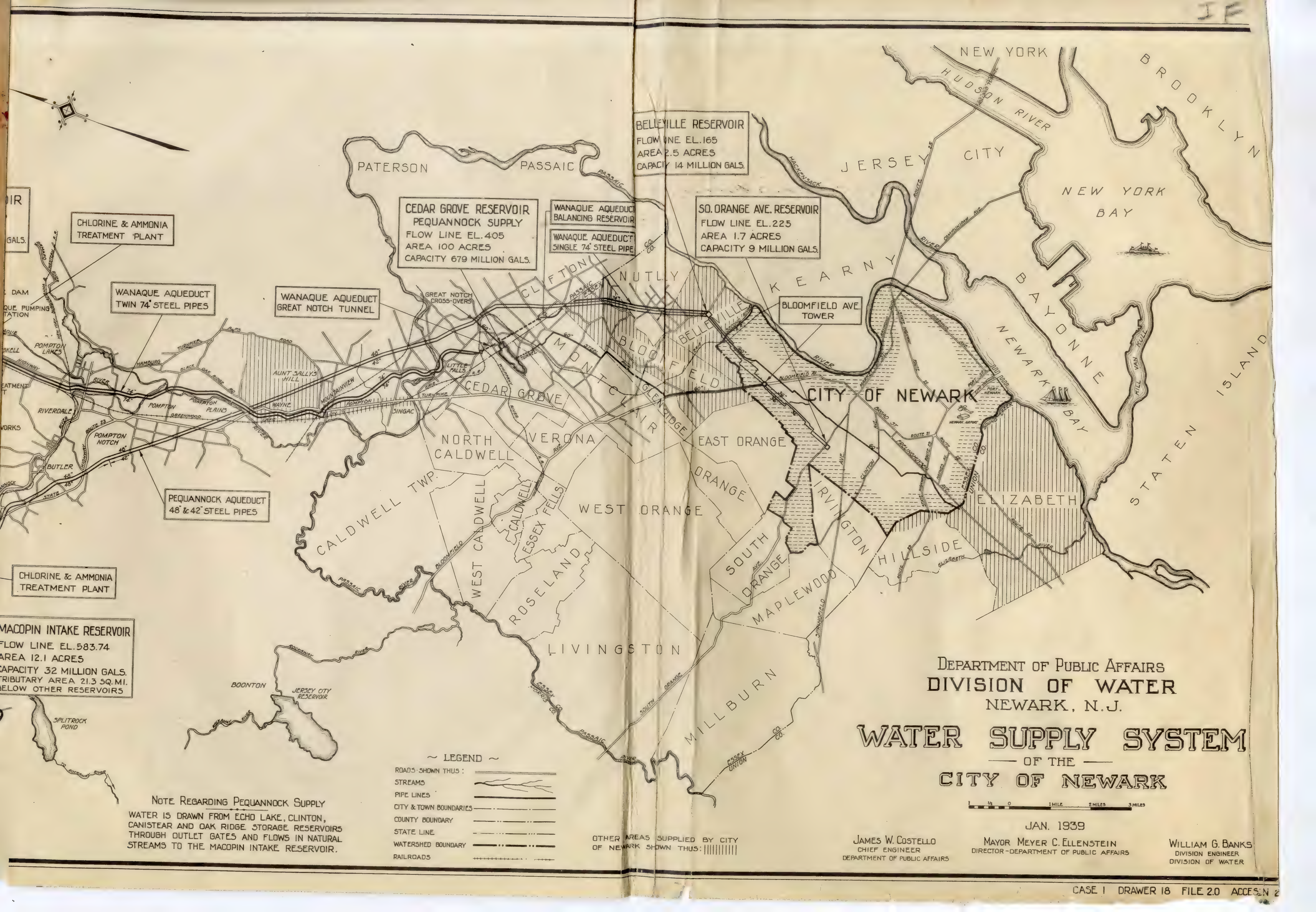
Owned and Operated solely by Newark

WANAQUE SUPPLY

Built and Operated by North Jersey District
Water Supply Commission jointly for Newark
and other Municipalities.







IF

IR
GALS.

CHLORINE & AMMONIA
TREATMENT PLANT

WANAQUE AQUEDUCT
TWIN 74" STEEL PIPES

WANAQUE AQUEDUCT
GREAT NOTCH TUNNEL

CEDAR GROVE RESERVOIR
PEQUANNOCK SUPPLY
FLOW LINE EL. 405
AREA 100 ACRES
CAPACITY 679 MILLION GALS.

WANAQUE AQUEDUCT
BALANCING RESERVOIR
WANAQUE AQUEDUCT
SINGLE 74" STEEL PIPE

SO. ORANGE AVE. RESERVOIR
FLOW LINE EL. 225
AREA 1.7 ACRES
CAPACITY 9 MILLION GALS.

BLOOMFIELD AVE.
TOWER

PEQUANNOCK AQUEDUCT
48" & 42" STEEL PIPES

CHLORINE & AMMONIA
TREATMENT PLANT

MACOPIN INTAKE RESERVOIR
FLOW LINE EL. 583.74
AREA 12.1 ACRES
CAPACITY 32 MILLION GALS.
TRIBUTARY AREA 21.3 SQ. MI.
BELOW OTHER RESERVOIRS

NOTE REGARDING PEQUANNOCK SUPPLY
WATER IS DRAWN FROM ECHO LAKE, CLINTON,
CANISTEAR AND OAK RIDGE STORAGE RESERVOIRS
THROUGH OUTLET GATES AND FLOWS IN NATURAL
STREAMS TO THE MACOPIN INTAKE RESERVOIR.

~ LEGEND ~

- ROADS SHOWN THUS: ————
- STREAMS ————
- PIPE LINES ————
- CITY & TOWN BOUNDARIES ————
- COUNTY BOUNDARY ————
- STATE LINE ————
- WATERSHED BOUNDARY ————
- RAILROADS ————

OTHER AREAS SUPPLIED BY CITY
OF NEWARK SHOWN THUS: |||||

DEPARTMENT OF PUBLIC AFFAIRS
DIVISION OF WATER
NEWARK, N.J.

WATER SUPPLY SYSTEM — OF THE — CITY OF NEWARK

1 1/2 0 1 MILE 2 MILES 3 MILES

JAN. 1939

JAMES W. COSTELLO
CHIEF ENGINEER
DEPARTMENT OF PUBLIC AFFAIRS

MAYOR MEYER C. ELLENSTEIN
DIRECTOR - DEPARTMENT OF PUBLIC AFFAIRS

WILLIAM G. BANKS
DIVISION ENGINEER
DIVISION OF WATER

THE PEQUANNOCK SUPPLY

NEWARK'S HIGH-LEVEL SUPPLY, furnishing water principally to the portions of Newark west of Elizabeth Avenue, High Street and Summer Avenue, is the Pequannock Supply. It is owned and operated solely by the City.

SOURCE OF SUPPLY is the Pequannock River, a tributary of the Passaic River. Supply works were built for the most part by the East Jersey Water Company, a company organized by several private interests who owned property and water rights on the river. Construction work was started in 1839 and completed in 1900.

THE PEQUANNOCK WATERSHED of the Newark Water Supply System embraces 63.7 square miles, from which, as developed, it is estimated that 57 million gallons of water daily can be obtained during the driest of years. The city controls 89 per cent of this area, or about 36,250 acres, leaving 11 per cent, or 4500 acres, privately owned. Upon this Watershed have been constructed the following reservoirs:

OAK RIDGE RESERVOIR with an area of 482 acres, a capacity of 3895 million gallons, an elevation of flow line 846 feet above sea level and a tributary area of 21.7 square miles, below Canistear Reservoir. Constructed 1889 to 1892 with flow line 10 feet lower than present level and with 1300 million gallons less capacity. Dam raised 10 feet, 1917 to 1919. Overflow and discharge from Canistear Reservoir passes into or through this reservoir.

CLINTON RESERVOIR with an area of 423 acres, a capacity of 3518 million gallons, an elevation of flow line 992 feet above sea level and a tributary area of 10.5 square miles. Constructed 1889 to 1892.

CANISTEAR RESERVOIR with an area of 350 acres, a capacity of 2407 million gallons, an elevation of flow line 1086 feet above sea level and a tributary area of 5.6 square miles. Constructed 1892 to 1900 as a supplement to the original storage, and required in order that the Pequannock development would be capable of supplying 50 million gallons of water a day.

ECHO LAKE RESERVOIR with an area of 300 acres, a capacity of 1678 million gallons, an elevation of flow line (with flash boards) 894 feet above sea level, and a tributary area of 4.6 square miles. This was originally a natural body of water whose surface was raised, 1889 - 1892, in the original construction work, and from which the city had the right to draw water, but which was not owned entirely by the city. Subsequently, from 1921 to 1925, the entire rights to the reservoir were purchased and improvements were made which increased the available storage.

MACOPIN RESERVOIR with an area of 12.1 acres, a capacity of 32 million gallons, an elevation of flow line 583.74 feet above sea level and a tributary area below the other reservoirs of 21.3 square miles. Constructed 1889 to 1892. Overflow and discharge from all other reservoirs pass into or through this reservoir.

The drainage of the western section of the Watershed is gathered into Oak Ridge, the northeastern into Clinton, the northwestern into Canistear and the eastern into Echo Lake. From these four storage reservoirs water is drawn as required and flows in the natural stream beds to Macopin Reservoir, which is the intake reservoir.

TOTAL STORAGE in the Pequannock Reservoirs is about 11,400,000,000 gallons. Available storage equals 10,500,000,000 gallons, about half a year's supply at the present rate of consumption.

PEQUANNOCK AQUEDUCT - At the intake reservoir, as the name implies, the water is let into the aqueduct which conveys Pequannock water to Newark. This Pequannock Aqueduct consists of two riveted steel pipes which run parallel for about twenty-one miles to Belleville Reservoir. The two pipe lines are separate and independent and can be so operated. The so-called No.1 Line is 48-inch and was constructed 1889 to 1892. Its capacity was not sufficient to deliver the 50 million gallons daily required from the Pequannock supply by the Newark-East Jersey Water Company contract, and in 1896 the No.2 Line was constructed. This line is 48-inch for a distance of about 5 miles and 42-inch for the remainder of its length.

BELLEVILLE RESERVOIR, located in the Town of Belleville, just north of the Newark-Belleville line, serves as an equalizing reservoir for the low portion of Newark east of Elizabeth Avenue, High Street and Summer Avenue. Both Pequannock and Wanaque water can be supplied to the reservoir, but Pequannock is usually used. It has an area of 2.5 acres, a capacity of 14 million gallons and an elevation of flow line 165 feet above sea level. It was completed in 1869 and put in service in 1870 as part of the Belleville Works, authorized by the legislature of 1861 but not constructed until after the Civil War. Originally, water was pumped to it from collecting basins on the westerly bank of the Passaic River in Belleville. From Belleville Reservoir water was distributed to the low portion of Newark west of the Pennsylvania Railroad and to a small reservoir and pumping station located just west of Clifton Avenue opposite Seventh Avenue; the Clifton Avenue Reservoir, until its abandonment in 1912, serving as the distributing reservoir for the portion of Newark east of the Pennsylvania Railroad; and the Clifton Avenue Pumping

Station, until its abandonment in 1892, supplying directly the highest portions of the city and South Orange Avenue Reservoir (See below). With the completion of the first stage of the Pequannock supply in May 1892, Belleville Reservoir was supplied with water by gravity through the Pequannock Aqueduct directly from Macopin Intake instead of by pumping from the basins at the Passaic River. Upon the completion of Cedar Grove Reservoir in 1904, water therefrom was supplied to Belleville Reservoir, supplemented in recent years by Pequannock water directly from Macopin at times of heavy draft.

SOUTH ORANGE AVENUE RESERVOIR, located at South Orange Avenue and Eighth Street, Newark, is an equalizing reservoir for the portion of Newark lying west of Elizabeth Avenue; High Street and Summer Avenue, and east of Peshine Avenue and Branch Brook Park. It has an area of 1.7 acres, a capacity of 9 million gallons and an elevation of flow line 225 feet above sea level. It was completed in 1871 as the high-service distributing reservoir for the Belleville Works. Water was pumped to this reservoir from Clifton Avenue Reservoir (see under Belleville Reservoir). With the completion of the first part of the Pequannock Supply in 1892, which included a 36-inch steel pipe extension of the 48-inch No.1 Pequannock pipe line from Belleville Reservoir to the South Orange Avenue Reservoir, the Clifton Avenue Pumping Station was abandoned and Pequannock water was supplied directly by gravity to the highest portions of Newark and to South Orange Avenue Reservoir for distribution therefrom, as first stated above. Since the completion of Cedar Grove Reservoir in 1904 as the main distributing reservoir for the Pequannock Supply, South Orange Avenue Reservoir has received its supply of water in general, directly from Cedar Grove Reservoir.

CEDAR GROVE RESERVOIR, located on the mountain above Montclair, is the main distributing reservoir for the Pequannock Supply. It has an area of 100 acres, a capacity of 679 million gallons and an elevation of flow line 405 feet above sea level. Built to provide a reserve of about a 15-day supply closer to the city, it was put in service in 1904. It furnishes opportunity for clarification and sedimentation by storage, and insures clear and pure water to the city when heavy rainfalls cause roily water at the upper reservoirs.

A 60-inch steel pipe, about a mile long, conveys water to this reservoir from the Pequannock Aqueducts at Great Notch, with connection at Great Notch so arranged that water from either or both

Pequannock pipes can be turned into the reservoir or shut off as may be desired.

TRANSMISSION LINES FROM CEDAR GROVE RESERVOIR - An outlet tunnel of horse-shoe section, 7 feet high by 7 feet wide, about 3000 feet long, through the mountain east of the reservoir, followed by about 7 miles of 60-inch steel pipe line through Montclair, Glen Ridge and Bloomfield to Bloomfield Avenue at Sixth Street, Newark, conveys water from Cedar Grove Reservoir to Newark.

From the Bloomfield Avenue Tower, so called (a gate house at Sixth Street, housing meters, which record the flow through five main feeders) Pequannock water is distributed throughout Newark. The highest portions of the city, such as the Vailsburgh, Roseville, Clinton Hill and Silver Lake sections are supplied directly from Cedar Grove Reservoir, in some cases through pressure reducing valves. The High Pressure Fire System in downtown Newark is likewise supplied directly. Two lines convey water from the tower to South Orange Avenue Reservoir for distribution therefrom as previously described; two lines extend to Belleville Reservoir to supply Cedar Grove Reservoir water to it as required for distribution to the low area, and one line connects with the Low Pressure System of downtown Newark at Eighth Avenue, at which point pressure regulating valves permit high pressure water to feed in, whenever needed to maintain the required low pressure.

SANITARY CONTROL AND WATER TREATMENT - Every precaution is taken to safeguard the Pequannock supply. City owned property is posted and policed to exclude undesirable persons. The important portions of the 110 miles of streams are cleaned and patrolled to prevent pollution. Garbage and waste is removed from all occupied properties, whether owned by the city or not. Outside toilets are cleaned and all materials disposed of at a disposal plant. A local doctor is constantly on watch for cases of sickness on the Watershed. The Water Department maintains its own laboratory where daily tests are made of physical characteristics such as color, taste, odor, turbidity, micro-organisms, and of bacteria in the water delivered to Cedar Grove Reservoir and to the City. Weekly microscopical and bacteriological tests are made of the waters of all main streams on the Watershed. Independent bacteriological and sanitary supervision is also exercised by the Newark Department of Health and by the State Department of Health

As water enters the aqueducts at the intake at Macopin it is sterilized with chlorine. Ammonia, in varying amounts, depending upon the season, is

added previous to chlorination, thereby reducing the amount of chlorine required and producing more satisfactory results. After this so-called chloramine treatment the water goes to Cedar Grove reservoir, where as a result of aeration, storage and exposure to sunlight, it is improved in clarity, color and taste.

From time to time, as microscopical examinations of stream and reservoir waters show the presence of micro-organisms that affect taste and odor, such waters are treated with copper-sulphate. This treatment destroys organisms before they increase to such an extent as to be offensive.

THE WANAQUE SUPPLY

NEWARK'S LOW LEVEL SUPPLY, furnishing water to the low-lying portions of Newark east of Elizabeth Avenue, High Street and Summer Avenue, is from the Wanaque River, a tributary of the Passaic River. Supply works were built by the North Jersey District Water Supply Commission for the City of Newark and seven other municipalities. Construction work was started in 1920 and completed in 1930.

THE WANAQUE WATERSHED embraces 94.4 square miles, from which, during the driest of years, it is expected that an average of about 100 million gallons daily of water can be obtained. This "so-called "safe Yield" of the Wanaque Project is allocated to the participants as follows:

Newark	40.5 M.G.D.	Clifton	6.75 M.G.D.
Paterson	20 M.G.D.	Montclair	5 M.G.D.
Kearny	12 M.G.D.	Bloomfield	4 M.G.D.
Passaic	11 M.G.D.	Glen Ridge	0.75 M.G.D.

WANAQUE RESERVOIR - The storage reservoir of this development has an area of 2300 acres, a capacity of 27,600 million gallons and an elevation of flow line 300 feet above sea level.

RAYMOND DAM - The main dam of Wanaque Reservoir is located in the Borough of Wanaque, near the Village of Wanaque in the County of Passaic, New Jersey. It is an earth dam, 1500 feet long and 100 feet high above the original ground surface, with concrete core wall to bed rock 90 feet below the original surface. Slightly more than a million cubic yards of earth are contained in this structure.

Seven other smaller dams close low points in the hills surrounding the reservoir. A concrete overflow-weir 550 feet long is just south of Raymond Dam.

WANAQUE AQUEDUCT conveys water from Wanaque Reservoir at Raymond Dam to Belleville Reservoir, where connection is made with the Pequannock System. The aqueduct consists of (a) 485 feet of 84-inch reinforced concrete pipe laid in a tunnel through the rock wall just south of the Raymond Dam, at one end connected by about 300 feet of 84-inch steel pipe with the headworks at the dam, and at the lower end extended with 100 feet of 84-inch steel pipe to a connection chamber; (b) from this point 72,950 feet of twin 74-inch lock-bar steel pipe line, cross connected at six points, followed by 161 feet of single 74-inch lock-bar steel pipe extending to a tunnel through the mountain at Great Notch; (c) Great Notch Tunnel of horse-shoe-section, concrete lined, 7 feet high by 7 feet wide, with a length of 9,400 feet and with 66-inch reinforced concrete pipe placed inside of the tunnel for a distance of 462 feet at the westerly end, and 944 feet at the easterly end, to resist internal water pressure for which the tunnel was not originally designed, and (d) 24,340 feet of single 74-inch lock-bar steel pipe from Great Notch Tunnel to the Newark take-off at Belleville Reservoir.

WANAQUE PUMPING STATION, located at Raymond Dam, makes the full head of the Wanaque Reservoir available for transmitting water through Wanaque Aqueduct. Whenever necessary, as the water surface in the reservoir drops, the pumps may be operated to raise the head on the aqueduct to that corresponding to a water surface at Elevation 300.

A BALANCING RESERVOIR for equalizing the flow in the Wanaque Aqueduct is located in Clifton near the easterly end of Great Notch Tunnel. It is a covered concrete reservoir having a capacity of 15 million gallons, with overflow at Elevation 258.

THE COST OF THE WANAQUE PROJECT was about \$26,542,000, exclusive of interest during construction. Newark's 40.5 million gallons daily allotment in the Wanaque Project cost \$14,509,617.28, of which \$3,098,890.77 was interest during construction.

WATER TREATMENT - Water, as it leaves Wanaque Reservoir, is chlorinated after ammonia gas is added to produce the chloramine treatment found so successful on the Pequannock Supply. Wanaque water is also lime treated to overcome its natural acidity. The lime is added after the chlorine. Now and then, during the year as required, copper sulphate is applied to the water in portions of the reservoir to control growths of micro-organisms. Aerators are provided at Raymond Dam for use as required to eliminate taste and odors. The very large storage in Wanaque Reservoir produces a water low in color, free from turbidity and of good bacterial quality.

EARLY HISTORY OF NEWARK'S WATER SUPPLY SYSTEM

THE WATERING PLACE - In the original layout of Newark, following its settlement in 1666, the founders set aside a small triangular plot on the south side of Market Street, west of Washington Street, which was known as "The Watering Place". Settlers watered their cattle there and carried water away in pails for home use. For more than a century after the founding of Newark, the people depended for their water supply upon this watering place near the four corners and upon wells dug as the need arose. Town pumps were established at different points. Fire cisterns were also constructed at a number of places. They were brick chambers built beneath the streets, with arched top and an opening through which the water could be pumped out and used to extinguish fires.

THE NEWARK AQUEDUCT COMPANY - In 1800 farsighted citizens, seeing the need for a water supply system to serve the rapidly growing community, incorporated the Newark Aqueduct Company. It was created by an act of the Legislature passed November 17, 1800. The company laid wooden conduits to convey water from the springs west of High Street and south of Thirteenth Avenue, which were the source of the stream supplying the old watering place. These first conduits were logs about 12 inches in diameter, bored with a 4-inch hole, the logs being pointed at one end, reamed out at the other end and driven together to form a continuous pipe line. They were laid along Market Street with branches along several side streets. It was the wonder of the age when the streets were opened for the laying of these first mains. Queries were made without number, and many an old timer viewed with alarm the new-fangled notion of bringing water from distant springs to the back door. Well water was good enough, many people thought; the alarmist was abroad, as he is in every generation, predicting all sorts of evil consequences. The town might be flooded some day when the pipes had rotted away, and other calamities were sure to follow.

The first reservoir in the system was probably a reservoir 106 feet long and 38 feet wide, with a depth of about 12 feet, constructed at South Orange Avenue and Springfield Avenue, to collect the water from the springs in this locality. Cast-iron pipe was soon substituted for the wooden conduits. Just when this was done is not known, but perhaps about 1830, as the 10-inch outlet pipe from this reservoir, uncovered in a collar excavation about 1915, was of cast-iron and of a very early pattern.

(EARLY HISTORY)

The sequence of subsequent additions to the system are in doubt, but it seems reasonable to assume that at about this same time, 1830, water from springs south of Sussex Avenue and east of First Street was conducted by another iron pipe line to a small reservoir north of Orange Street, between Boyden and High Streets, to supply the northerly portion of the town. This pipe ran for about 800 feet in the bed of the Morris Canal. It seems likely that it was laid at the time the canal was being built, which was between 1827 and 1836.

The next step of expansion of the Newark water supply is believed to have taken place between 1840 and 1845, and to have consisted of the construction of a rather elaborate system of springs, driven wells and connecting pipe lines on both sides of the Morris Canal in the little valley north of Orange Street and west of Clifton Avenue, now covered in part by Branch Brook Park Lake. Seventy-three wells and springs, with pipes and gates, were revealed when the lake was drained a few years previous to 1900. A 12-inch cast-iron pipe, then considered of monster size, conveyed water from the springs and wells west of the Morris Canal, under the canal, to a small covered reservoir in the Branch Brook basin near Seventh Avenue, about 75 feet above sea level. Water from the springs and driven wells east of the canal also flowed to this reservoir, as did water from the springs previously referred to, south of Sussex Avenue and east of First Street. From this reservoir the water flowed through a 10-inch pipe to another reservoir at the old Needle Factory on Mill Brook, just west of what is now Clifton Avenue. It was about forty feet long, thirty feet wide and fourteen feet deep, and was known as the "Reservoir in the Quarry". From this reservoir a 10-inch cast-iron pipe ran easterly to Quarry Street (now Eighth Avenue) at Factory Street, and continued in Quarry Street to Broad Street, and in Broad Street to Orange Street. At the Needle Factory, and also at the Washington Factory located lower down on Mill Brook, at what is now Factory Street, opposite Drift Street, were additional springs from which the water was pumped by water power, and when that failed, by steam power. Most of these features are referred to in the agreement between the Newark Aqueduct Company and the Newark Aqueduct Board dated December 9, 1845, and all are shown on a map of the Aqueduct Company's property as of 1855.

In this supplementing of the supply, and perhaps as the first step, wells were driven in the old spring lot south of Sussex Avenue and in the vicinity of the old Lock Street school on the east side of Lock Street

north of Central Avenue and connected to the pipe line running to the Orange Street reservoir previously referred to as Supplying the northerly portion of the town.

BEGINNING OF MUNICIPAL SUPPLY - Agitation for municipal ownership of the water supply began in 1837, the year following the adoption of the city charter. A bill was passed by the Legislature on February 28, 1838, empowering the city to raise money for a water plant. The private interests owning the Aqueduct Company were powerful enough and shrewd enough to have inserted in the act a provision compelling the city to buy out the company. Instead, the city entered into a contract with the Aqueduct Company on December 9, 1845, for a water supply for fire-fighting purposes, and assumed all future responsibilities in regard to the development of the system of pipes for distributing the water to fire hydrants and cisterns, while the Aqueduct Company continued to supply the domestic needs of the citizens of Newark.

Continued agitation for, and study of the possibilities of obtaining, a municipal supply from other sources, continued. On September 6, 1856 a committee appointed by the Common Council of the city reported that Second River could not be considered because of valuable mill sites, and that the Passaic River at Little Falls was also out of the question on account of preemption of water rights by private interests, the Society for the Establishing of Useful Manufactures. The rights of the Morris Canal Company were also considered, and Lake Hopatcong, Budd's Lake and other sources were inspected, but all were too distance. The only sources remaining were those of the Aqueduct Company and the Passaic River below Paterson.

NEWARK AQUEDUCT BOARD - On March 20, 1860 the Legislature created the Newark Aqueduct Board, composed of the Mayor and six citizens, and transferred to it the entire holdings of the Newark Aqueduct Company for the sum of \$150,000, giving the Board the right to operate and develop the system. The Board was authorized to issue bonds to this amount, bearing interest at 7 per cent and redeemable one-half in 1866 and one-half in 1871. The holdings included the spring lots, properties along Mill Brook, the Branch Brook tract and reservoirs, together with the part of the distributing system still owned by the company, consisting of seventeen miles of water pipe, 14,000 feet being 10-inch, 3,500 feet being 8-inch, 7,000 feet being 6-inch and the balance being 3-inch and under. Parts of this property were sold by the city for about \$70,000, and other parts valued at

\$75,000 were ultimately transferred to the Essex County Park Commission during the early years of the construction of Branch Brook Park.

Recommendations were immediately made by the Board's engineer that a new source of supply be acquired either from the Passaic River or from the Morris Canal. Authority was granted by the Legislature of 1861 for the building of works at Belleville to take water from the Passaic River. Construction was delayed by the Civil War, and the Board proceeded with such extensions and improvements of the old works as were imperatively needed. The old springs were enlarged and deepened, but no considerable increase in flow resulted. In 1862 a new reservoir was built by cleaning out the old basin in Branch Brook, east of the canal, and raising and strengthening the banks. In 1865 a second reservoir was built, adjoining the first on the north. The capacity of the two was about 12 million gallons. The level was about 87 feet above sea level, ten or twelve feet higher than the old reservoirs. The construction of these reservoirs rendered the old reservoirs at Orange Street and at South Orange Avenue near High Street, as well as the "Reservoir in the Quarry" of no use, and they were abandoned. A 24-inch cast-iron main was laid in place of the original 10-inch from the new reservoirs to the corner of Quarry Street (now Eighth Avenue) and Broad Street. Water in considerable quantity was also drawn directly from the Morris Canal, by agreement with the Morris Canal Company, for a stipulated price.

BELLEVILLE WORKS - In 1866 property was bought in Belleville, construction work began in 1867 and the new Belleville works were put in operation in 1870. They consisted of a reservoir (Belleville Reservoir) at elevation 165 feet above tide water, having a capacity of 14 million gallons; two basins each covering about an acre on the west bank of the Passaic River in the northeasterly corner of Belleville, into which ground water from the hills to the west and from the river could filter, and which were filled at each flood tide with water from the river through a five-foot conduit about three hundred feet long, extending from the basins to the river bank, and a pumping station to lift the water from the collecting basins to Belleville Reservoir. In September 1871, South Orange Avenue Reservoir was completed as a high service reservoir, to which water was pumped by a pumping engine located at the corner of Factory Street and Eighth Avenue. This same year it was decided to build a new low service distributing reservoir to take the place of the Branch Brook Reservoirs. A site in the old quarry hole

west of what is now Clifton Avenue, opposite Seventh Avenue, at an elevation of 114 feet above sea level 27 feet higher than the old reservoirs, was selected, and during the next few years the Clifton Avenue Reservoir was built, together with a new high service pumping station. Water from Belleville Reservoir was delivered to the suction well at the Clifton Avenue pumping station, from which it overflowed into Clifton Avenue reservoir. The area east of the Pennsylvania Railroad was supplied from the Clifton Avenue reservoir, the area between the railroad and High Street was supplied from Belleville reservoir, the area west of High Street, except for the highest parts, was supplied from South Orange Avenue reservoir, and the highest parts were supplied directly by pumping from the High Service pumping station. Extensions to the distribution system were made, so that by 1876 it was reported to consist of 126 miles of mains as compared with 19 miles in 1860, and the average daily consumption had increased from 800,000 gallons to 6,200,000 gallons daily.

DISSATISFACTION WITH PASSAIC RIVER WATER - Almost immediately complaints were made of the quality of the water, which was affected by the pollution from the cities farther up the river. These complaints increased and the consumption became far in excess of the capacity of the supply, even though many of the old abandoned wells and springs were again put into service and other local additions to the system were made. The aqueduct Board found the financing of the work difficult, due to the low maturity of the bonds, and in addition to all the other troubles, the time of maturity of the bonds issued in connection with the construction of the Belleville works was approaching.

PEQUANNOCK RECOMMENDED - In 1879, the eminent engineering firm of Croes & Howell, which had been engaged to report on a new water system, recommended obtaining a supply from the Pequannock River. About this same period, Mayor Haynes of Newark suggested the possibility of a cooperative effort on the part of a group of municipalities. This is probably one of the earliest considerations in water supply matters of the cooperative idea which was consummated forty-five years later in the Wanaque project. As against the plan of a public supply, propositions were advanced for the purchase of water by the city, from water works owned by private capital such as the Society for the Establishing of Useful Manufactures (S. U. M.), the Morris Canal and other private interests. Bills were introduced in the Legislature to secure franchises for doing this, and the power of the city to acquire water outside its own limits was challenged. Public interest culminated in 1887 in a mass meeting, at which a committee was appointed composed of seven

leading citizens of the city and members of the Aqueduct Board. This committee presented a printed report approving a plan for a municipal water supply to be developed from the upper tributaries of the Passaic and rejecting the idea of purchasing filtered Passaic River water from private water companies or driving more wells.

PEQUANNOCK SUPPLY BUILT BY EAST JERSEY WATER COMPANY-

After negotiations a contract was entered into on September 24, 1889, with the East Jersey Water Company, a consolidation of private interests owning property and water-rights on the Passaic River and its tributaries, which was organized to construct storage reservoirs in the Pequannock Watershed and an aqueduct capable of delivering to Newark 50 million gallons daily, by May 1892, for a total cost of \$6,000,000. By the date agreed upon, the Oak Ridge, Clinton and Macopin reservoirs, and 21 miles of 48-inch steel pipe were completed and the first Pequannock water was delivered to Belleville reservoir. For the deferment of the payment of \$2,000,000 of the total, the East Jersey Water Company agreed to operate the supply works but to retain the right to 22.5 million gallons daily for a period of eight years, or until September 24, 1900, during which period the city's allowance would be limited to 27.5 million gallons per day. Many controversies arose regarding the capacity of the pipe line and the adequacy of the storage to assure the 50 million gallons daily supply to the city. The company added the Canistear reservoir to the storage and built a second steel pipe line in 1896.

BELLEVILLE WELLS - In 1898 the allotment of 27.5 million gallons daily which Newark had the right to draw from the Pequannock was insufficient for the city's needs, and during a severe cold spell early in the year it was necessary to pump water directly from the Passaic River at Belleville. To prevent a recurrence of this dangerous emergency measure, and to make certain an adequate supply for the remaining two years until the entire Pequannock plant should be turned over to Newark, a rather extensive system of driven wells was installed at the old Belleville pumping station. During 1898 and 1899 the city began the installation of water meters. The resulting curtailment of waste reduced the consumption of water to such a point that the limitation until 1900 of 27.5 million gallons daily from the Pequannock caused no further shortage, and the driven wells at Belleville were never called upon for any continued supply.

PEQUANNOCK SUPPLY ACQUIRED BY NEWARK - Legal proceedings were instituted on the part of the city in 1900 to

force the East Jersey Water Company to fulfill its Pequannock Supply Contract in regard to several points in controversy. Reports and testimony by the foremost hydraulic engineers of that period, John R. Freeman, J.J.R. Croes, Frederick P. Stearns and Desmond Fitzgerald, showed the need of additional works built by the East Jersey Water Company in 1896, to assure a yield and delivery of 50 million gallons daily from the Pequannock Watershed. The points in controversy were finally settled and a decree in Chancery was mutually agreed upon, which gave the city practically all it had claimed. All of the reservoirs and pipe lines built by the company on the Pequannock Watershed were turned over to the city on September 24, 1900, and, with the final payment to the company of \$2,000,000, the entire Pequannock Water Supply system became the property of the City of Newark.